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5 METHOD, SYSTEM AND USER INTERFACE FOR INPUTTING AND
MANIPULATING TOKENISED STRINGS

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BACKGROUND OF THE INVENTION

Field of the Invention

15 The present invention relates generally to computer
generated documents and in particular to computer
generated index documents.

Description of Related Art

20 For many documents created on a computer, like text
documents, HTML documents, presentations and others,
related index pages are useful in finding desired content
within the document, or are useful in getting information
about bibliographic sources or the like. Index documents
include documents that in turn include any or all of a
25 table of contents, a headword index, figure or table
index as well as a bibliographic index, for example,
which are referred to herein as an index page.

30 Creating an index page involves a lot of formatting
work, and is therefore time consuming and costly. An
index page typically has a plurality of index lines
having a specific content and format. In an index page
that is a table of contents of a book, for example, there
exist index lines for different hierarchical levels of
headings, i.e., main heading, sub-heading etc.

35 Figure 1 shows an example of an index page 100 that
is a table of contents of a textbook. Index page 100 has

a plurality of index lines, which have different functions and are formatted differently.

The first index line is the title "Contents" followed by the index line "Summary" with page number 5. Next are three index lines representing hierarchies of headings. A table of contents like that shown in Figure 1 is an example of an index page, where the index lines represent a different level in a hierarchical order within the index page.

Another example is a bibliographic index, which can contain a plurality of different types of information sources like books, journals, theses, e-mails, www-pages and so on. Different types of index lines, in this example, do not represent different hierarchical levels, but do represent different types of information sources.

It is known to define the content and format of an index line using a string of instruction symbols (tokens) and attributes associated with the tokens. In the following an example of a token string with corresponding attributes (in parenthesis) is provided for an index line of a table of contents, such as that in Figure 1:

chapter number **CH** (character style); entry text **ET** (style template); tabulator **TAB** (type, filling character, position); page number **PN** (character style).

Typically, "chapter number" is represented by a numerical value, e.g., 1, 1.1, 1.3.5. "Entry text" is the chapter title and has a style defined by the style template. The tabulator filling character, e.g., a blank character or a dot, fills the space from the entry text to the page number. The tabulator has two other attributes, i.e., the tabulator type (centred, left, right) and a position measured in mm, inches or any other suitable metric. In most cases, the page number is positioned at the right side of the index line.

It is known to either input the token string directly by typing the instruction symbols and attribute values, or by using a user interactive menu dialog. These two methods are complicated and time consuming for the user. Furthermore, the problem arises that the syntax of tokens and attributes may be input incorrectly.

Arranging the tokens to define an order is particularly difficult to handle because tokens could be entered inside another token. Therefore, the computer program has to check the syntax of the input token string every time, and if the syntax is wrong, the token string has to be corrected by the user. Besides index pages other instruction sets, for example defining a modem interface, may have to be input into a computer with correct syntax.

SUMMARY OF THE INVENTION

According to the present invention, a method of interactively generating a computer readable instruction set having instruction symbols and related variables comprises:

- a) generating a signal for displaying a list of selectable instruction symbols,
- b) arranging a selected instruction symbol to form part of the instruction set,
- c) generating a signal for displaying a list of selectable variable values, if at least one variable relates to the selected instruction symbol,
- d) arranging a selected variable value to form part of the instruction set, and
- e) repeating steps a) to d) until the instruction set is completed.

The instruction set may preferably define a formatted index document or database relating to another arbitrary document type.

In another embodiment, a computer-based method of interactively generating an index page displays a window

including a list of index page types. Upon selection of one index page type in the list of index page types, a window including a list of index line types is displayed.

Upon selection of one index line type in the list of
5 index line types, a token string including a plurality of tokens is displayed. The plurality of tokens includes only tokens appropriate for the one index line. Upon selection of one token, or alternatively a window for entering content associated with the one token, user
10 selectable attributes for the content associated with the at least one token are displayed.

In one embodiment, index line types in the list of index line types represent different levels in a hierarchical order within the index page, and the list of
15 index page types includes a table of contents. The list of index page types also includes a bibliographic index, and upon selection of the bibliographic index, the index line types in the list of index line types represent different sources of bibliographic information.

20 In one embodiment, the method of this invention is implemented using a computer-based graphic user interface comprising:

an insert index page dialogue window
comprising:

25 an index page type window wherein the index page type window includes a list of index page types; and the index page type window displays at least one index page type in the list of index page types;

30 an index page title window coupled to the index page type wherein the index page title window displays a title for the at least one index page type;

35 an index line type window coupled to the index page type window wherein the index line type window includes a list of index line

types for the at least one index page type;
and

5 a token string coupled to the index line
type window wherein the token string includes
a plurality of tokens and further wherein each
token comprises an element in an index line
type selected in the index line type window.

The method of this invention is also contained a
computer program product for interactively generating an
10 index page dialogue window. The computer program product
includes program code adapted for:

displaying a window including a list of index
page types;

15 displaying a window including a list of index
line types upon selection of one index page type in
the list of index page types;

20 displaying a token string including a plurality
of tokens, upon selection of one index line type in
the list of index line types, wherein the plurality
of tokens includes only tokens appropriate for the
one index line type; and

displaying, for at least one token in the
plurality of tokens, user selectable attributes for
data associated with the at least one token.

25 A system, according to this invention includes a
processor and a memory coupled to the processor. Stored
in the memory are computer instructions for a method of
interactively generating an index page. Upon execution
of the computer instructions on the processor, the method
30 comprises:

displaying a window including a list of
index page types;

35 displaying a window including a list of
index line types upon selection of one index
page type in the list of index page types;

displaying a token string including a
plurality of tokens, upon selection of one

index line type in the list of index line types, wherein the plurality of tokens includes only tokens appropriate for the one index line type; and

5 displaying, for at least one token in the plurality of tokens, user selectable attributes for data associated with the at least one token.

In more general terms, one embodiment of the
10 invention includes a user interface for inputting and manipulating tokenised strings such as those found on an index page. Furthermore, with this user interface, syntax errors in such strings can effectively be avoided.

15 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an illustrative example of a prior art index page.

Figure 2 is a block diagram of a computer system that includes the method of this invention.

20 Figure 3 is a schematic illustration showing an exemplary dialog window displayed on a display screen according to an embodiment of the present invention.

Figure 4 is a schematic illustration of a dialog window displayed on a display screen according to another
25 embodiment of the present invention.

Figure 5 is a flow chart schematically illustrating an embodiment of the present invention.

In the drawings and in the following detailed description, elements with the same reference numeral are
30 the same element. Also, the first digit of a reference numeral represents the number of the figure in which that element first appeared.

DETAILED DESCRIPTION

35 A method 230 (Figs. 2 and 5), according to the present invention, allows a user to easily and conveniently generate each index line on an index page

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tokens, preferably in the correct locations, are presented in interface 295 for each element in the index line level selected by this user. In addition, if there are style or other attributes associated with a particular token, the user accesses these attributes from interface 295 and makes the desired selections. The user is unconcerned with encoding the order or format used to specify the attributes of a particular token.

Figure 3 is a more detailed diagram of one embodiment of graphic user interface 295. As discussed more completely below, graphic user interface 295 includes an index page dialogue window that in this embodiment includes a plurality of windows that are used to select and generate each index line in the index page. Various buttons are used to expand some of the windows in interface 295. In another embodiment, index page dialogue window 295 includes a plurality of overlain cards that each has a tab. When the user selects a particular tab, that card is moved to the front of window 295. The particular technique used to implement the features of interface 295 of this invention are not essential to the invention, and will vary depending upon the characteristics of the computer system in which the invention is used, and the methods used to implement the invention in that computer system.

In one embodiment, to generate index page dialogue window 295, the user first accesses an Insert icon in a tool bar of an application in which the user wants to create the index page. Upon accessing the Insert icon, the user is presented with a menu that includes an entry "Indexes." Upon selection of entry "Indexes," the user is presented with yet another menu that includes "Indexes," that the user in turn selects. In response to this last selection, the user is presented with one embodiment of graphic user interface 295, as illustrated in Figure 3.

In select index line type operation 504, the user
15 can select any desired index line type from those
displayed in the index line type window, e.g.,
windows 306A (Fig. 3) and 306B (Fig. 4). In the example
of Figure 3, the user selects level "1" for index line
type to be added to the Table of Contents in
20 operation 504. In the example of Figure 4, the user
selects "Book" in operation 504 for the type of index
line to add to the Bibliography.

The tokens in an index line are instruction symbols
35 for defining elements of the index line. Accordingly,
the particular tokens and associated display field
windows may be different for each index line of the index

page. However, in a given index line type, the string of
tokens includes only tokens that are appropriate for
elements in that type of index line type, e.g., tokens
that represent each element in that type of index line
5 type.

By clicking on the respective display field window
on the screen the user can then enter the corresponding
content, e.g., "1.1.2" in window 311A for chapter
token 310A, or "fluids" in window 313A for title
10 token 313A, in insert content operation 506. In one
embodiment, not only is the content displayed in the
window for the token, but also the entire index line is
displayed in index page display window 325.

Typically, each token has a default style for the
15 information entered in the display field window for that
token. However, in addition, upon selecting a token,
display selectable attributes operation 507 displays
attributes that the user can define or modify for the
selected token.

For example, in one embodiment, for token ET
(Fig. 3), the user could select, in select attributes
operation 508, either template 1 or template 2 to define
the attributes of the text entered. In another
embodiment, the user can use style window 304A to select
25 a paragraph style associated with the index line
represented by token string 303A in select attributes
operation 508. If the user selected token TAB, the user
can utilize tab window 305A to select the tab stop
position and the fill character inserted between the
30 title and the page number in select attributes
operation 508. Hence, in this embodiment, the attributes
may include style templates, character styles selected in
character style window 307A or 307B, or tabulator
positions.

35 When a user selects either a particular token or a
display field window for that token, only the attributes
associated with the specific selection are enabled in

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user can now input title, author, year of publication,
editor etc in operations 506 to 508. Displayed
tokens 310B, 312B, 314B, and 316B are adapted to the
chosen document type so that all necessary information
5 can be input. In the case of a web page, for example, it
is possible to insert tokens for a hyperlink to the
referenced www-page. Also, notice that since token
string 303B does not include a tabulator token, tabulator
window 305B is greyed-out to indicate that this attribute
10 is unavailable.

The index page may be assigned to a document
presently opened in the computer or a defined portion
thereof as, for example, a chapter or paragraph. The
invention, however, is not restricted to the generation
15 of index pages. Other types of instruction sets may also
be created by the present invention. An example of such
an instruction set is an instruction string containing
AT-commands for a modem interface.

The interactive editing of the instruction set
20 speeds up the generation or editing of the instruction
set. In the case of a bibliographic index, for example,
the user may enter a short name for a field like the
author. If a corresponding entry does not exist in the
bibliographic index, the user can then click on a button
25 to create a new entry for the bibliography. The
interactive entry of instruction symbols and variables
furthermore can avoid the entry of instruction language
that is not permitted. As a user builds or edits an
index page, in one embodiment, the index page is
30 displayed in index page display window 325.

In one embodiment, graphic user interface 295 is
implemented using a hardware configuration like a
personal computer or workstation as illustrated
schematically in Figure 2 by computer system 200.
35 However, in another embodiment, graphic user
interface 295 is implemented using a client-server
configuration 250 that also is illustrated in Figure 2.

Graphic user interface 295 may be displayed on a display screen of client device 200 while some or all operations of method 230 are carried out on a server computer 280 accessible by the client device 200 over a data
5 network 203 and 204, such as the Internet, using a browser application or the like.

Herein, a computer program product comprises a medium configured to store or transport computer readable code for method 230 or in which computer readable code
10 for method 230 is stored. Some examples of computer program products are CD-ROM discs, ROM cards, floppy discs, magnetic tapes, computer hard drives, servers on a network and signals transmitted over a network representing computer readable program code.

15 As illustrated in Figure 2, this storage medium may belong to computer system 200 itself. However, the storage medium also may be removed from computer system 200. For example, method 230 may be stored in memory 284 that is physically located in a location
20 different from processor 201. The only requirement is that processor 201 is coupled to the memory containing method 230. This could be accomplished in a client-server system 250, e.g., system 200 is the client and system 280 is the server, or alternatively via a
25 connection to another computer via modems and analog lines, or digital interfaces and a digital carrier line.

For example, memory 284 could be in a World Wide Web portal, while display unit 216 and processor 201 are in a personal digital assistant (PDA), or a wireless
30 telephone, for example. Conversely, the display unit and at least one of the input devices could be in a client computer, a wireless telephone, or a PDA, while the memory and processor are part of a server computer on a wide area network, a local area network, or the Internet.

35 More specifically, computer system 200, in one embodiment, can be a portable computer, a workstation, a two-way pager, a cellular telephone, a digital wireless

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telephone, a personal digital assistant, a server
computer, an Internet appliance, or any other device that
includes the components shown and that can execute
method 230. Similarly, in another embodiment, computer
5 system 200 can be comprised of multiple different
computers, wireless devices, cellular telephones, digital
telephones, two-way pagers, or personal digital
assistants, server computers, or any desired combination
of these devices that are interconnected to perform
10 method 230 as described herein.

Herein, a computer memory refers to a volatile
memory, a non-volatile memory, or a combination of the
two in any one of these devices. Similarly, a computer
input unit and a display unit refer to the features
15 providing the required functionality to input the
information described herein, and to display the
information described herein, respectively, in any one of
the aforementioned or equivalent devices.

In view of this disclosure, method 230 can be
20 implemented in a wide variety of computer system
configurations. In addition, method 230 could be stored
as different modules in memories of different devices.
For example, method 230 could initially be stored in a
server computer 280, and then as necessary, a module of
25 method 230 could be transferred to a client device 200
and executed on client device 200. Consequently, part of
method 230 would be executed on the server processor 282,
and another part of method 230 would be executed on
processor 201 of client device 200. In view of this
30 disclosure, those of skill in the art can implement the
invention of a wide variety of physical hardware
configurations using an operating system and computer
programming language of interest to the user. For
example, Figure 2 shows input devices 215 and 218, but
35 other input devices, such as speech recognition software
and/or hardware could be used to input the selections and
data for method 230.

In yet another embodiment, method 230 is stored in memory 284 of system 280. Stored method 230 is transferred, over network 204 to memory 211 in system 200. In this embodiment, network interface 283
5 and I/O interface 202 would include analog modems, digital modems, or a network interface card. If modems are used, network 204 includes a communications network, and method 230 is downloaded via the communications network.

10 Method 230 of the present invention may be implemented in a computer program including comprehensive office application STAROFFICE that is available from Sun Microsystems, Inc. of Palo Alto, CA. (STAROFFICE is a trademark of Sun Microsystems.) Such a computer program
15 may be stored on any common data carrier like, for example, a floppy disk or a compact disc (CD), as well as on any common computer system's storage facilities like hard disks. Therefore, another embodiment of the present invention also relates to a data carrier for storing a
20 computer program for carrying out the inventive method. Yet another embodiment of the present invention also relates to a method for using a computer system for carrying out the presented inventive method. Still another embodiment of the present invention further
25 relates to a computer system with a storage medium on which a computer program for carrying out the presented inventive method is stored.

While the invention has been particularly shown with reference to a preferred embodiment thereof, it will be
30 understood by those skilled in the art that various other changes in the form and details may be made therein without departing from the spirit and scope of the invention.